

Green

MEMORANDUM

TO: See Distribution List Below
FROM: Daniel Ellsberg
SUBJECT: DECLASSIFICATION OF M-914

DATE: 2/19/62

MEMO: M-1480

The attached is being reissued to replace M-914, Reply to M-737, dated 1/31/62, which was originally classified Confidential. The attachment is now unclassified, and your copy of M-914 may be disposed of as classified waste (Confidential).

DE/ss

M-737

Attachment: M-1479, Reply to M-~~914~~, dtd. 2/19/62 (Unclassified)

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AUTHORIZATION FOR CHANGE IN CLASSIFICATION

Item M-914, dtd. 1/31/62, subj: REPLY TO M-737Author(s) D. Ellsberg to H. LinstoneDated 1/31/62Classification (and/or Automatic Regrading Group) of the above is to be changed from CONFIDENTIAL (4)to UNCLASSIFIED effective this date, 2/6/62

Reason: _____

Author's full signature* *Daniel Ellsberg*Department Head's full signature *E. Jones 13:11:62*Air Force Officer's full signature *John W. Shinnors*

The following is to be filled in by the Assistant for Liaison if a publication is downgraded to Unclassified:

Action: ☒ In-house clearance☐ DOD clearance☐ For Official Use Only*A. S. Mangel*
Assistant for Liaison*14 Feb 62*
Date

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MEMORANDUM

TO: H. A. Linstone
FROM: Daniel Ellsberg
SUBJECT: REPLY TO M-737

DATE: 2/19/62
MEMO: M-1479

COPIES TO: H. Bailey, R. Blachly, J. Ellis, G. Fisher, A. George,
M. W. Hoag, T. Harris, L. Johnson, G. Pauker, R. Rainey,
H. Speier, J. Summerfield, A. Wohlstetter, C. Wolf, Jr.,
J. A. Kershaw, B. H. Klein

As a vehicle for a few, hasty comments on your methodology, let me focus upon your chart on p. 27 of M-458, which I take as an indication of the questions you seek to answer and the data you propose to collect for answering them.

In the chart below, the columns represent different contingencies or conflicts, the numbers 1, 2, 3, 4 are "names" for alternative weapons systems of a certain weapon type (equal-cost alternatives? I presume so, though this is not stated), and their ranking in a column represents decreasing order of effectiveness in that given conflict.

Conflict	a ₁₁	a ₁₂	b ₁₁	b ₁₂	b ₂₁	c ₁₁	c ₁₂	c ₂₁
Most effective	1	1	1	1	2	2	4	4
	2	2	3	2	4	4	2	2
	3	3	2	4	1	1	3	3
Least effective	4	4	4	3	3	3	1	1

What questions might this data, in this sort of display, help to answer? Precisely how useful would it be, in different situation; and how likely is it to be useful at all?

This particular display would be useful only in the event that it revealed that one or more of the systems was strictly dominated by another; it would be of little or no interest with respect to the choice between a set of systems none of which strictly dominate another; and virtually all important problems of choice will reveal several such alternatives. I would not

belabor this point, or this chart, except that I suspect that you would disagree with each of these judgments. Let me, then, try to support them.

The hypothetical data you present on p. 27 does not reveal any dominance. None of the four alternatives shown is better than another one in every conflict. Yet you appear to derive certain conclusions, or at least strong hints, from the chart; I claim that this cannot be done, without introducing judgments not reflected in the data as presented.

The problem is that you give only an ordering of the alternatives for each, given contingency. For contingency b_{11} , for example, system 3 is better than system 2. But how much better? How much better compared to, say, the amount by which system 1 is better than system 3, or 2 is better than 4, for the same contingency? How much compared to the amount by which 2 is better than 3 under contingencies a_{11} , a_{12} , b_{12} , etc.? This sort of question is indeed harder to answer than questions as to simple ranking; but it is the sort of question that must be answered if choices are to be made in the absence of a dominant system. If the chart "suggests" any such choices, it must be either because it "suggests" answers to such questions (in some mysterious way) without "giving" them, or because you already feel you know the answers, in which case the chart is not contributing anything to your decision.

Although some indication of the magnitudes of the intervals between adjacent ranks is necessary for choice among undominated alternatives, it is not enough; we must also have some judgments of the relative weight to be assigned various contingencies, either in terms of relative likelihoods or some other basis. For example, your chart is meant to "suggest," I suspect, that system 3 is relatively uninteresting. Yet suppose that b_{11} , c_{12} and c_{21} were regarded as the "only important contingencies" (by reason of likelihood or for other reasons); and that 3 were enormously better than 2 or 4 in the first of these conflicts and almost as good as 1, while in the last two conflicts 3 is enormously better than 1 and almost as good as 2 or 4? (Ignore the question of whether it is sensible to focus on these particular conflicts in this case; the point is that it is essential to have more than a ranking before even a "suggestion" of preferability is valid.)

Likewise, the "suggestion" that system 2 alone is preferable to system 1 alone, could be supported only on the basis of judgments concerning: (a) the relative likelihood and importance of the first four conflicts (in which 1 is preferred to 2) relative to the last four (in which 2 is preferred to 1); and (b) the degree to which one of these systems is preferred to the other in each of these cases. The chart simply does not indicate that you have either sought or achieved such data.

As for the "suggestions" that systems 1 and 4 "in combination," or systems 1 and 2 "in combination" might be preferable to the programmed system, again the chart lends no support to this; assuming that the comparison is made on an equal-cost basis against the programmed system, there is no

"logical" indication how some achievable "combination" of any two of the systems would stack up against any of the others. The notion that this can be deduced, or even guessed with any confidence, by looking at the performance of pure alternatives is simply invalid.

I conclude that your chart would be significant only when it reveals domination. I conjecture that revelations of domination, when they occur at all, are unlikely to cut down the decision-maker's problem significantly; i.e., that pure dominance of one system is very unlikely. But I suspect that you disagree. The very fact that you suggest here a chart which is useful only for detecting dominance would suggest that you consider that a useful thing to look for; and elsewhere your remarks indicate directly that you expect to find it. "It is the contention of this approach that as the number of conflicts considered increases we approach asymptotically a force structure which is fairly insensitive to changes in assumption." I take it that by changes in assumption you mean changes in the presumed relative likelihoods or importance of conflicts; so this proposition implies that you expect to find dominant or "almost dominant" strategies.

Well, I don't. A single example should illustrate the point: suppose, as Mac Hoag has suggested, that we look at c_{13n} , nuclear combat with the USSR/CPR. Trying to do well in that contingency eats up most of practically any fixed budget short of enormously expanded budgets; in other words, a system that does relatively well in that case is almost sure to be relatively rotten in many other cases. Hence, for budgets that are at all limited, the mere inclusion of this case ensures that we cannot really hope for a "force structure which is insensitive to changes in assumption"; changes in assumptions as to the relative likelihood of this or similar contingencies are bound to have a major impact on the relative desirability of different force structures. We simply cannot escape from the necessity to make judgments of the sort I have discussed.

I may seem to be harping on the shortcomings of a particular display of data. The problem is, it would seem to me very difficult to surmount these shortcomings on the global scale to which you seem to aspire. Since it seems essential to me to surmount them to arrive at any useful results, the only solution may be to restrict the set of contingencies and alternatives to be explored.

A particular problem in the limited war field will be defining relevant objectives and inventing methods of evaluating alternatives in terms of these various objectives (hoping to achieve more than a mere ranking). Prior to discovering such objectives and making them explicit, the meaningfulness even of a ranking such as you suggest in this chart is very suspect. (Moreover, the fact that objectives can change over time, partly as a result of technological change in capabilities, or change in expectations of enemy or allied behavior, or changes in "acceptable" budget levels, means that even these rankings -- which depend essentially upon the objectives, the "payoff function" -- can change. This possibility raises some doubts about the process of dropping certain contingencies from further consideration because they "don't make any difference" in

terms of currently-considered alternatives; with every new alternative considered, with changes in budget levels, etc., we would have to reintroduce at least some of those discarded contingencies for another look.)

Thus, it may be quite misleading just to ask, "What would you do if this item or unit is not available?" In the first place, it is not clear from this memo that the critical effect of specifying what it is you are trying to do has been clearly recognized, nor the impact upon goals of the relative (and absolute) availability of various alternatives. How satisfactorily would an equal-cost alternative substitute for the item or units removed? How much would it cost to achieve equal effectiveness with the substituted items? Might a lowering of objectives be indicated, or compelled?

Your comments on the relative difficulty of limited war problems versus general war problems seem justified. On that very score, I must have some doubts about a methodological approach which seems vastly more ambitious than any systems analysis of which I am aware in the general war field. If investigation produces only the sort of data considered in your chart (and it might fall far short of that), I cannot believe that McNamara "will be in a far superior position to make the right decisions than he is at present"; yet it seems doubtful that you could hope to go far beyond that all across the board. I would therefore second suggestions that the scope of your investigation be limited somehow. One way would be to focus on the "hunches" you mentioned at the meeting; this is probably the most promising. Another is to ask: Which important contingencies seems relatively neglected in current planning? In which contingencies would currently programmed systems look particularly bad? What changes in conditions (environment, capabilities, objectives) have recently occurred or are impending whose impact on programmed strategies or forces are probably not yet fully appreciated? In connection with such questions, your hunches would probably lead you toward significant, substantive improvements in programs.

DE/ss

D. E. Ellsberg